

In some spring waters (Ulupınar, Ayazma and Yalısu) that emerge from metamorphic rocks in Çatalca, SO_4 and Mn ions are over the limit values of TSE (2005). In addition, some parameters in spring waters that emerge from sedimentary rocks, limit values of the WHO (2006) and TSE (2005) are exceeded. For example, in some spring waters (Başpınar, Hamidiye Şifa and Sunmercan) where the Trakya Formation is the aquifer, SO_4 , Mn and Al, in some spring waters (Türkkızılayı, Akpınar, Nisa and Emirdağ) of Şile, Mn and also in one spring water (Taşeren) where the Aydos Formation is the aquifer, Fe and Mn quantities are out of the limit values (Table 3). It is considered that, some trace elements (Al, Fe, Mn, As, Hg, Co, Cd, Cr, Pb, Ni, Ti, Ba, Zn, Cu, U etc.) are in the geological units (volcanic, metamorphic, plutonic and sedimentary rocks) can influence water as heavy metals and

change the water quality adversely (Pehlivan and Yılmaz, 2005).

Off-limit values of pH and Cl in some spring waters (Mispak, Minella, Gümüşpınar, Kumsu, Hamidiye Şifa, Sunmercan, Kovanpınar, Taşpınar, Türkkızılayı, Emirdağ, Kervansaray and Beyza Taşdelen) in Çatalca, Eyüp and Şile counties could be explained by water drilling wells are fed by shallow groundwaters or surface waters which are close to rain water composition. Another reason why both of parameters are kept out of the recommended limit values, could be quality of shallow groundwaters influenced adversely by antropogenic liquid waste arising from existance of inhabiting areas in some drainage areas. Likewise, being high of NH_4 amount in Buzada could be related with existance of inhabiting areas (Table 3).

Table 3. The label informations of bottled spring waters which are produced in İstanbul

Çizelge 3. İstanbul'da üretilen şişelenmiş kaynak suların etiket bilgileri

Commercial Name	Mispak	Ulupınar	Minella	Gümüşpınar	Ayazma	Yalı Su	Buzada	Başpınar
County	Çatalca	Çatalca	Çatalca	Çatalca	Çatalca	Çatalca	Silivri	Eyüp
Village	Karamandere	Karamandere	Çiftlikköy	Gümüşpınar	Akalan	Yalıköy	Beyciler	Göktürk
Permit Date	21.01.2008	01.04.2008	08.04.2008	07.06.2010	17.02.2005	02.04.2007	27.10.2010	30.05.2006
Permit Number	136	167	170	KS.34.42	25730	44	KS.34.53	12
pH	6,2	6,51	6,25	5,56	7,72	6,5	8	6,6
Cl- (mg/l)	ND	25,45	19,26	14,53	26	23,78	44,98	22,8
Na ⁺ (mg/l)	10,82	15,05	11,83	9,3	94,98	14,2	56,6	19,7
SO_4^{2-} (mg/l)	2,01	16,59	1,8	6,2	37,5	40,3	18,52	6,2
NH_4^+ (mg/l)	ND	Absent	Absent	0	Absent	0	0,5	Absent
Fe ²⁺ (µg/l)	3,73	27,38	< 2	<2	4,3	2,08	47,3	Absent
Al ³⁺ (µg/l)	1,53	48,38	< 3	27,5	3,9	8,73	18,2	Absent
Mn ²⁺ (µg/l)	5,68	39,57	2,4	<2	< 2	4,3	39,1	31
Con. (µS/cm)	102	183,3	69	90,4	333	127,4	489	204

Table 3 (continues)

Commercial Name	Kumsu	Hamidiye Şifa	Sunmercan	Özpınar	Sırmakes	Kovanpınar	Taşpınar
County	Eyüp	Eyüp	Eyüp	Arnavutköy	Beykoz	Şile	Şile
Village	Kemberburgaz	Kemberburgaz	Pirinççi	Boğazköy	Dereşeki	Kurnakoy	Bıçkıdere
Permit Date	22.07.2010	20.04.2010	05.05.2008	21.06.2006	31.03.2008	17.06.2010	13.10.2006
Permit Number	KS.34.51	KS.34.35	178	16	166	KS.34.44	35
pH	7,1	6,6	6,85	7,9	7,28	6,35	6,1
Cl- (mg/l)	39,25	42,6	30,1	34,87	13,1	29	15,04
Na ⁺ (mg/l)	24,5	6,72	25,48	29,65	7,69	15,4	9,29
SO_4^{2-} (mg/l)	17,3	34,13	15,81	17,41	3,96	3,86	3,82
NH_4^+ (mg/l)	0	<0,05	Absent	-	0	<0,05	0,02
Fe ²⁺ (µg/l)	32,6	<11	29,7	17,6	<0,3	<0,3	8,8
Al ³⁺ (µg/l)	9,1	3,94	134,7	9,3	<0,3	3	Absent
Mn ²⁺ (µg/l)	1,5	<0,6	33,8	-	25,12	19,32	Convenient
Con. (µS/cm)	287	63,8	306	264	80,2	130,9	119,5